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SOME POINTS IN THE PROGNOSIS OF PULMONARY TUBERCULOSIS,

with special reference to the Age of the Patients and the Duration of the Disease,

by

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The Influence of age and Duration on the immediate prognosis of Chronic Pulmonary Tuberculosis.

In the National Campaign against Tuberculosis we have two different sets of institutions at work:

1. The Antituberculosis dispensaries, whose aim is to prevent the disease, by dissemination of knowledge amongst the poor, and also to act as curative institutions, by recognising the disease, and obtaining for each case suitable treatment, whilst the disease is in its earliest stages.

II. The Sanatoria.

Institutions where the disease may be cured, and where the patients may be educated to live such a life on their return home, as will give most hope of ultimate arrest.

Whilst there is little doubt that the majority of patients suffering from Pulmonary Tuberculosis, would be the better for a stay in a Sanatorium, there is unfortunately a great deficiency in the accommodation. It becomes necessary, therefore to select cases for Sanatorium treatment, with a view to obtaining a maximum of benefit in a minimum of time. In other

words an immediate prognosis is required.

In arriving at a prognosis many points have to be considered. Whilst some of the points mentioned below have received more or less attention, it appears that the factors of age, and duration of the disease before coming under treatment have not received the attention they deserved. Amongst the points to be taken into account are the following:

Extent of the Disease:-

It is evident that the more limited the lesion in the lung, the more likely is it to become arrested, and vice versa. In 1908, 55 cases of arrest at Northwood Sanatorium were analysed. It was noted that of those cases 89% had one lobe affected, whilst the remainder had two lobes affected. No case with more than two lobes affected was arrested. Though we not uncommonly read of healed cavities, it is interesting to note that Kingston Fowler has never met with such a case post mortem, which had been recognised during life. He is of opinion, that the majority of cases,so described, in post mortem reports, are examples of caseous masses, becoming encapsulated by fibrous tissue, whose inner surface, had become smooth.

It must not be imagined however, that because cavities do not readily heal, they necessarily carry with them a bad prognosis. On the contrary, softening

of a caseous mass and its expectoration may be Nature's method of cure. Whilst holding the office of Resident Medical Officer at Victoria Park Chest Hospital, I have on a number of occasions, observed that the signs of excavation coincided with a permanent drop of temperature to the normal, and was followed by a marked improvement of the patient's health.

It may be urged that cavity cases are associated with the formation of small aneurisms on the pulmonary artery, which aneurisms may be exposed in the cavity. Such a patient would be liable to rupture of the said aneurism, with consequent serious haemoptysis. I believe the danger has been greatly overrated. During my period of office at Victoria Park Chest Hospital (nearly 3 years) the number of patients who died from haemoptysis was under a dozen. The cases admitted there included a high proportion of advanced cases. During my year of office at Winchmore Hill Sanatorium, which institution has received 231 advanced cases, only one case of fatal haemoptysis has come under my notice.

The Condition of the "Unaffected" Lung:-

Considerable stress is laid by Fowler on this point. He states that if there is evidence of increased functional activity in the unaffected lung, it may be regarded as a point in the patient's favour, and vice versa.

The following signs would seem to point to increased functional activity, viz:- puerile breathing, increase in the expansion, and possibly a slightly hyperresonant percussion note. Curiously, the significance of this type of breathing is sometimes mistaken and feeble breathing on the opposite side overlooked.

The Characters of the General Symptoms. The presence of marked toxaemia always carries with it a grave significance. Its presence may be taken as indicating a breakdown in "Natural Resistance". Marked toxaemia is not necessarily always associated with extensive local disease. Many cases, on the contrary, appear for treatment with advanced physical signs, whose general condition is fair, and who rapidly improve under treatment.

The condition of the digestion is of great importance. There is always hope of improvement, whilst the appetite remains good.

The Character of the Temperature. A great deal may be learned from the type of temperature, as to the predominant changes in the Lungs. Thus, an inverse rise of temperature or a"continuous rise", indicating as it does an acute miliary spread, (a condition generally associated with profound toxaemia) is a symptom of grave import. The same may be remarked of high remitting temperatures, which often point to acute caseating Broncho Pneumonia. On the other hand normal temperatures, or temperatures which are nearly

always normal, indicate a probability of a favourable result.

The Influence of Complications: Extension of the disease to other organs, diminishes the patient's chances. Should there be evidence of extension to the brain, larynx, kidneys, or bowel, the outlook is definitely bad. On the other hand extension to the pleura, may mean that the disease will progress only slowly. This is stated by Osler to be especially noticeable in cases complicated by pleurisy with effusion. As regards the influence of pneumothorax it may be stated that, as a general rule, the average duration of life after the occurrence of this accident is only a few weeks. On the other hand absorption of the air may occasionally be observed in patients whose general health has not been gravely undermined by very extensive or active disease. Moreover, a few cases of active tuberculosis appear to have been arrested by the occurrence of spontaneous pneumothorax. Possibly the collapse of the lung with its consequent closure of the bronchi and occlusion of its blood vessels was in a measure responsible for the result. Cases of tuberculous peritonitis complicating pulmonary tuberculosis do not, as a rule, offer a hopeful outlook. The presence of albuminoid degeneration is a bad omen.

The Influence of Age. A perusal of the monographs of Fowler, Godlee, Powell and Hartley, and the lectures on diseases of the lungs by Professor Lindsay, throw

little light on this point

Lindsay says that the most favourable results may be expected between the ages of 30-40 years. His statement is not in accordance with the experience gained at the Northern Sanatorium, as the tables of figures appended will show.

I find by a comparative study of the results of my own cases, that cases between the ages of 15-25 years do best, those between 25-35 years are slightly less satisfactory, those between 35-45 years are still less satisfactory, and those over 45 years make little improvement.

These statements are true, both as regards "sanatorium" and "hospital" patients.

As our experience in other diseases than Tuberculosis might lead us to expect better results in young than in older patients, the following points may indicate the reasons of more favourable results in the younger tuberculosis patients.

(a) Natural resistance to disease is higher in the young than in old and middle aged patients.

(b) Few young persons are the subjects of arterial disease, consequently, the blood supply of the affected part can be maintained more readily than in the case of persons whose arteries are beginning to lose their elasticity.

(c) Digestion - assimilation, elimination and metabolism generally, are maintained at a higher level of efficiency in the young than the old. The blood of the former is therefore more able to repair damaged tissues.

(d) Young patients are more readily brought under satisfactory "nerve influence". They are more free from worry about domestic or business matters than the older patients. They are more cheerful and more amenable to discipline.

(e) Young patients are able to undergo the hardships of open air life more easily than older ones who in Winter are liable to attacks of bronchitis.

(f) There is little tendency to generalised fibrosis in young patients. Whilst a considerable degree of fibrosis may undoubtedly delay the march of the disease through the lungs, it has the great disadvantage of impeding the circulation of fresh blood to thedamaged tissues. This factor may explain in some measure the small number of arrests which occur in the pulmonary tuberculosis of old people. The fibrosis probably predisposes to bronchitis, perhaps by producing chronic venous congestion.

(g) The period which elapses between the onset of the disease and the commencement of serious treatment, is often longer in the old than in young persons. Consequently, the disease gets a firmer grip in the former. Probably the longer period of neglect of

treatment may be explained by the inability of older patients with responsibilities to give up their occupations. In addition, we must take note of the fact that the symptoms in older patients are less typical than in the young. Errors in diagnosis are therefore more liable to occur. This is especially the case when the subjects of chronic bronchitis and emphysema become infected by tuberculosis.

Much more convincing than any arguments as to why we may expect better results in the young than the old, are the actual figures contrasting the results at different ages.

Sanatorium cases.

Cases which have given a positive Von Pirquet reaction or Calmette's reaction, but have not shown any physical signs of disease, have not been included. The Sanatorium cases include:-

(a) Cases who were sent in for a month's observation, (as their physical signs were of doubtful import), but who were proved to be tuberculous .

(b) Cases whose disease was limited to the apices of either one, or two lobes, and whose general condition did not indicate the presence of grave toxaemia.

(c) Cases of more advanced disease, of some years' standing, which, until recently, had not shown any activity since the original infection.

The Hospital Cases include several varieties of advanced cases (a) 3, 4 or 5 lobes being affected.

(a) Cases of advanced disease who are afebrile, and who do not show marked evidence of toxaemia.

(b) Cases of advanced disease, including examples of acute miliary and acute caseating tuberculosis.

(c) Cases with healed lesions of the upper lobes, but with signs of excavation and activity at the bases. (Not examples of Bronchiectasis).

(d) Cases complicated by bronchitis and emphysema and extensive fibrosis.

(e) Cases with evidence of serious tuberculosis disease of other organs (e.g.) Tuberculosis of larynx, bowel, peritoneum, &c.

Probable arrest.

In this class only such cases have been included as became free from all signs of activity comparatively early in their stay , whose powers of resistance enabled them to do six hours graduated work and exercise daily, without disturbance of pulse or temperature, and whose weight was at or above what would be considered normal for a patient of a given age and height, who were free from tubercle bacilli, in such cases as had any sputum.

Quiescent Cases. In this class have been included cases whose temperatures were normal and who were able to do full work, but who still had some physical signs present (not moist sounds), or whose signs of activity

had not been absent sufficiently long to justify the classification of "probably arrested".

Full work - Females

All the Sanatorium patients are females. It has consequently been arranged that their work shall, so far as possible, be of a character likely to be of use to them on their return home. They are trained through three grades and are expected to do six hours work and exercise daily.

Grade I.	Cleaning Brasses
	Folding Quilts and Rugs
	Washing Locker Tops
	Cleaning out Lockers
Grade II.	Washing Tiles
	Sweeping Wards and Corridors
	Cleaning Windows
	Washing up Crockery and Cutlery
	Preparing Tables for Meals
	Polishing Furniture
	Washing Dusters and Brooms
Grade III.	Making Beds
	Scrubbing Floors
	Scrubbing out Cupboards
	Black-leading Stoves
	Shifting Ward Furniture
	Turning out Pantry
	Gardening, Digging etc.
	Poultry Feeding
	Swedish Drill

SANATORIUM CASES.

Age	Probable arrest	Quiescent	Greatly improved	Improved	Stationary	Worse	Died	Total
15-25	62	30	32	16	1	0	0	141
25-35	22	19	19	13	4	0	0	77
35-45	4	6	4	6	1	1	0	22
over 45	0	1	7	3	2	0	0	13
Total	88	56	62	38	8	1	0	253

PERCENTAGES SANATORIUM.

Age	Probable arrest	Quiescent	Greatly improved	Improved	Stationary	Worse	Died	Total
15-25	44	21	23	11	1	0	0	100
25-35	28	25	25	17	5	0	0	100
35-45	18	27	18	27	5	5	0	100
over 45	0	8	54	23	15	0	0	100

WORKING CAPACITY (Sanatorium percentages)

Age	Full work	Light work	No work	Total	
15-25	79	12	9	100	
25-35	61	30	9	100	
35-45	50	27	23	100	
over 45	23	62	15	100	

WORKING CAPACITY (Sanatorium Totals)

Age	Full work	Light work	No work	Total	
15-25	111	17	13	141	
25-35	47	23	7	77	
35-45	11	6	5	22	
over 45	3	8	2	13	
Totals	172	54	27	253	

HOSPITAL CASES. Results in Totals.

Age	Probable arrest	Quiescent	Greatly improved	Improved	Stationary	Worse	Died	Total
15-25	0	17	7	15	18	16	20	83
25-35	0	5	3	22	10	6	10	56
35-45	0	0	10	18	7	3	12	50
over 45	0	3	5	19	7	1	7	42

HOSPITAL. Percentage Results.

Age	Probable arrest	Quiescent	Greatly improved	Improved	Stationary	Worse	Died	Total
15-25	0	21	8	18	22	7	24	100
25-35	0	9	5	40	18	10	18	100
35-45	0	0	20	36	14	6	24	100
over 45	0	7	12	45	17	2	17	100

Influence of the Duration of the Disease:

Having regard to the fact that the previous tables of figures indicate the very considerable increase in expectation of arrest or quiescence in young as compared with older patients, it is of interest to investigate the influence of the duration of the disease as a factor.

One would naturally expect to find that the prospects of patients with a shorter duration, better than those with more chronic disease. The following figures show that to some extent this is the case, but not strikingly so. A possible explanation may be found in the fact that considerable number of the cases of duration longer than one year had been under adequate institutional treatment, previous to their admission here. Some, therefore, of the cases of longer duration were admitted in a state tending towards arrest or quiescence. I, therefore, respectfully submit that as a guide to immediate prognosis, the duration of the disease is of less value than would appear probable at first sight. Moreover, in the absence of serious complications, that the age factor is a reliable and important guide.

The following table gives the percentage results obtained:-

15-25 years.

Arrests.	(a) Cases of one year's duration or under:-	48%
	(b) " over one year's duration:-	30%
Quiescent.	(a) Cases of one year's duration or under:-	12%
	(b) " over one year's duration:-	32%
Greatly improved.	(a) Cases of one year's duration or under:-	26%
	(b) " over one year's duration:-	11%
Improved.	(a) Cases of one year's duration or under:-	11%
	(b) " over one year's duration:-	5%

25-35 years.

Arrests.	(a) Cases of one year's duration or under:-	32%
	(b) " over one year's duration:-	23%
Quiescent.	(a) Cases of one year's duration or under:-	24%
	(b) " over one year's duration:-	26%
Greatly improved.	(a) Cases of one year's duration or under:-	24%
	(b) " over one year's duration:-	26%
Improved.	(a) Cases of one year's duration or under:-	15%
	(b) " over one year's duration:-	20%